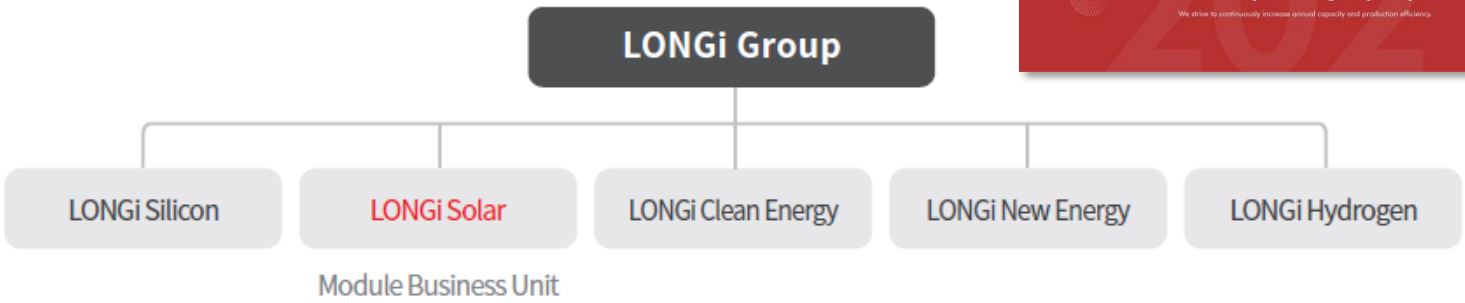
Short Important Notes

Each milestone accelerated the industrv



2000

STAGE 1
Semiconductor technology accumulation

2000
LONGi was established

2005
Formation of annual production capacity of 30 tons silicon ingot

2005

STAGE 2
Technology revolution of monocrystalline silicon wafers

2012
A-share market listing

2014
World's **No.1 monocrystalline silicon wafer** production
- RCz Ingot pulling (Rechargable Czochralski)
- Diamond Wire Slicing Technology
- M1/M2 Silicon standard

2014

STAGE 3
Enable monocrystalline to become the mainstream product

2015
Entered into solar cell and module production
World's No.1 in shipment of monocrystalline module

2018
The w orld's most valuable PV manufacturer
- PERC Trend
- LIR Technology (Light Induced Regeneration)
- Bifacial Technology

2019

STAGE 4
Utilizing solar technology to power the earth

2019
Next standard for ultra high efficiency modules
- Based on M6 Silicon Wafer Format

2020
New industry standard for wafer sizes
- M10 Silicon Wafer

Joined the Climate Group's RE100, EV100, EP100 initiative

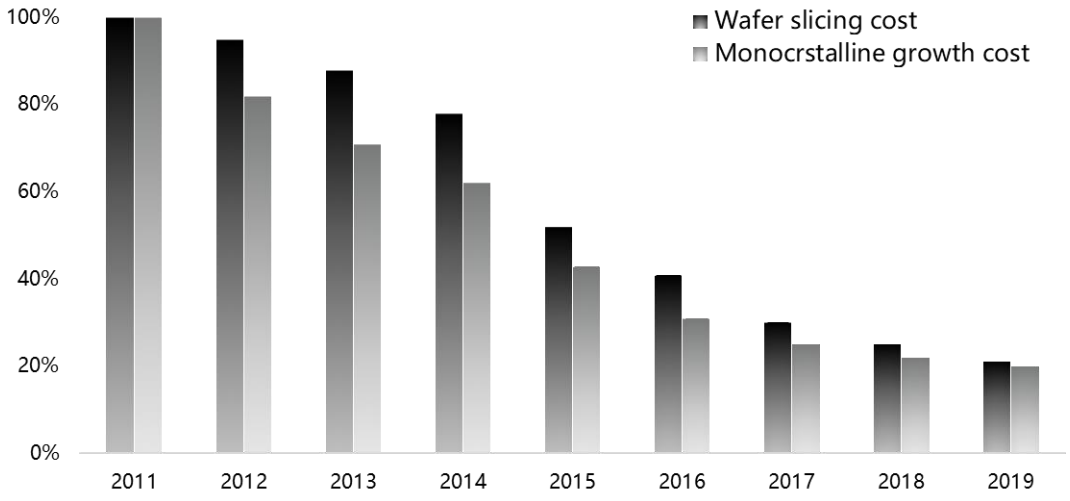
2021

2021
LONGi Hydrogen established

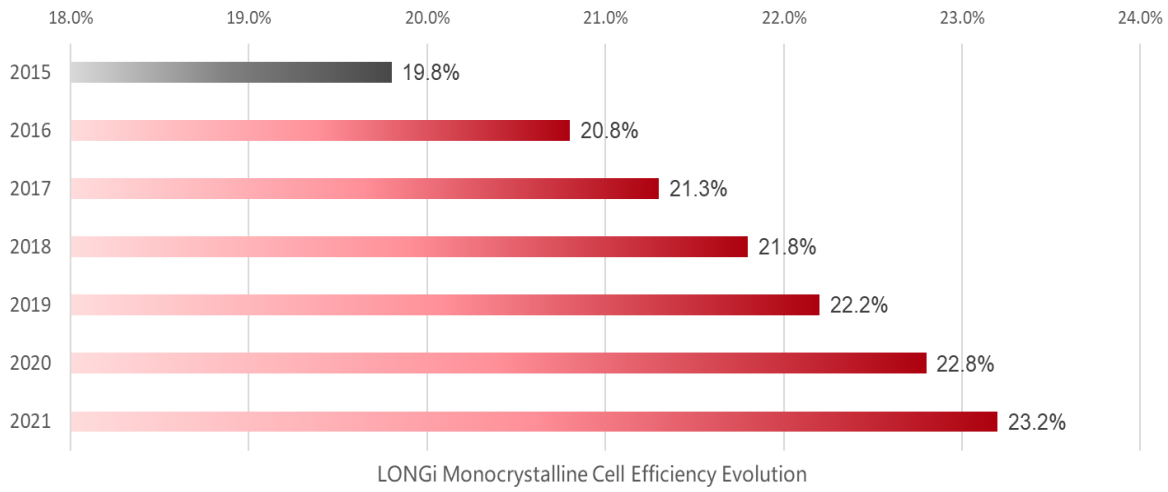
LONGi broke three more w orld records for solar cell efficiency
- N-type TOPCon Solar Cell Efficiency
- P-type TOPCon Solar Cell Efficiency
- HJT Solar Cell Efficiency

In past decade, Longi lead the revolution of the industry

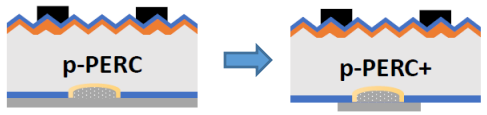
As a leading wafer manufacturer, Longi drives the cost of monocrystalline wafer to reduce greatly.



LONGi started mass production of PERC cells and modules in 2016, and lead the efficiency improvement.



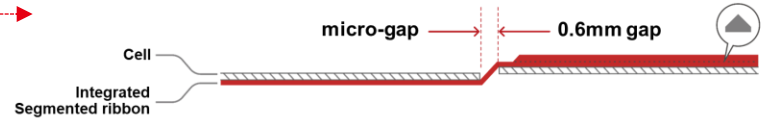
We did a lot to BOOST the Module Efficiency and Yield



Bifacial

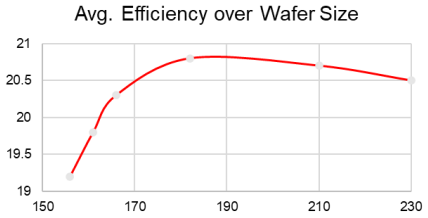
Smart soldering

Gain in module efficiency **0.3%**

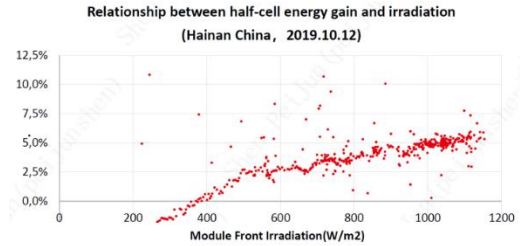


Efficiency & Yield

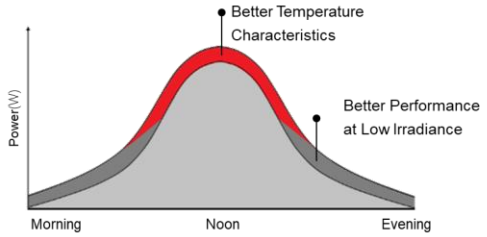
Optimum Cell Size



Half cut



Ga Doped



Wafer Quality

$O_{content}$ -34% (2011~2020)

Minority $Carrier_{lifetime}$ +18% (2014~2020)

And we are trying all possible for the ‘Best Practice’

Breaking world records 7 times a year,

Covering all mainstream Cell technology

Solving nature resource problem with leading technology

24.06%	25.21%	25.19%	26.81%	26.12%	25.40%
LONGi P-type Bifacial PERC Efficiency (2019.01)	**LONGi N-type TOPCon Cell Efficiency (2021.06)**	**LONGi P-type Bifacial TOPCon Efficiency (2021.07)**	**LONGi Bifacial N-HJT Efficiency (2022.11.19)**	**LONGi Bifacial P-HJT Efficiency (2022.09)**	**LONGi Bifacial Indium-Free N-HJT Efficiency (2022.03)**

2021 Intersolar Award
The only module manufacturer achieving ‘Intersolar award’
Demonstration of LONGi’s advanced technology and innovation

HIGH ACHIEVER
in PV Module Index
2019-2021

2019 PV Module Index HIGH ACHIEVER LONGi Solar RETC

2021 HIGH ACHIEVER RETC

TOP PERFORMER
in PV Module Reliability Scorecard
2017-2021

TOP PERFORMER 2022 PVEL PV MODULE RELIABILITY SCORECARD

Highest Power Generation
PV Magazine Test
Since June 2018

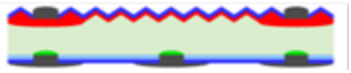
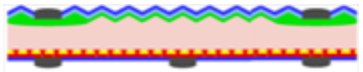
VERY GOOD pv magazine test MODULE

Ranked first in TÜV Rhineland
Power generation simulation: 2017, 2018
Outdoor empirical: 2019, 2020, 2021

All Quality Matters TÜVRheinland

Question: Which one will be the next ‘JUMP’?

- With the continuous progress of p-PERC cell efficiency, it will reach to 24% in the end of 2022, which is the most cost-effective tech.
- Advanced technology (TOPCon, HJT, IBC) is promising but need to face several challenges.

Cell Structure	p-PERC	n-TOPCon	HJT	IBC
Efficiency	23.5%	24.3%	24.3%	25%
Diagram				
LID	<2%	<1%	<1%	<1.5%
Bifacial factor	~70%	~80%	~90%	~60%
Power temperature coefficient	~0.34%/°C	~0.30%/°C	~0.25%/°C	~0.29%/°C
Cost	~€ 21million/GW	€ 28-36 million/GW	€ 57-71million/GW	~€ 42million/GW
HVM maturity	Mature	To be verified	To be verified	To be verified
Comments	1. cost-effective; 2. Mature and reliable;	1.Higher efficiency; 2. HVM challenge and high cost	1.Higher efficiency; 2. HVM challenge and high cost	1.Highest efficiency; 2. HVM challenge and high cost

High efficiency HPBC cells promote new technological revolution

Efficiency of conventional HPBC cells exceeds 25%

Efficiency of PRO version HPBC cells break through 25.3%

Light absorption

Multi-layer anti-reflection film and absence of front grid increase light absorption

Light absorption

Photoelectric conversion

Multi layer passivation reduces impurity recombination and improves photoelectric conversion efficiency

Photoelectric conversion

Electric transmission

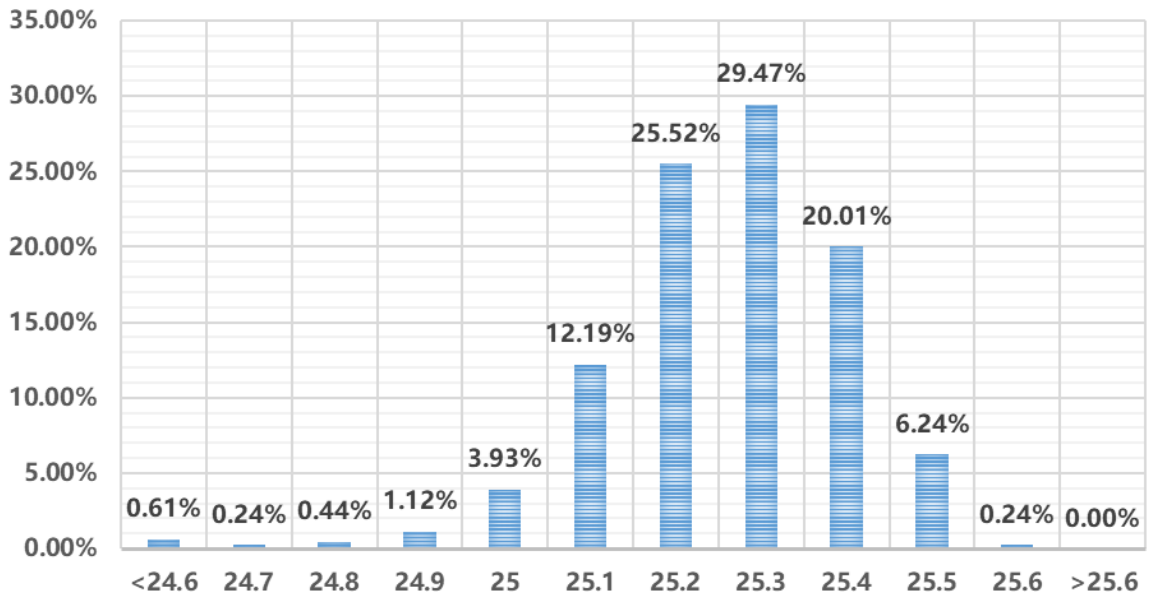
Innovative all-back welding technology stabilizes the current transmission

Electric transmission

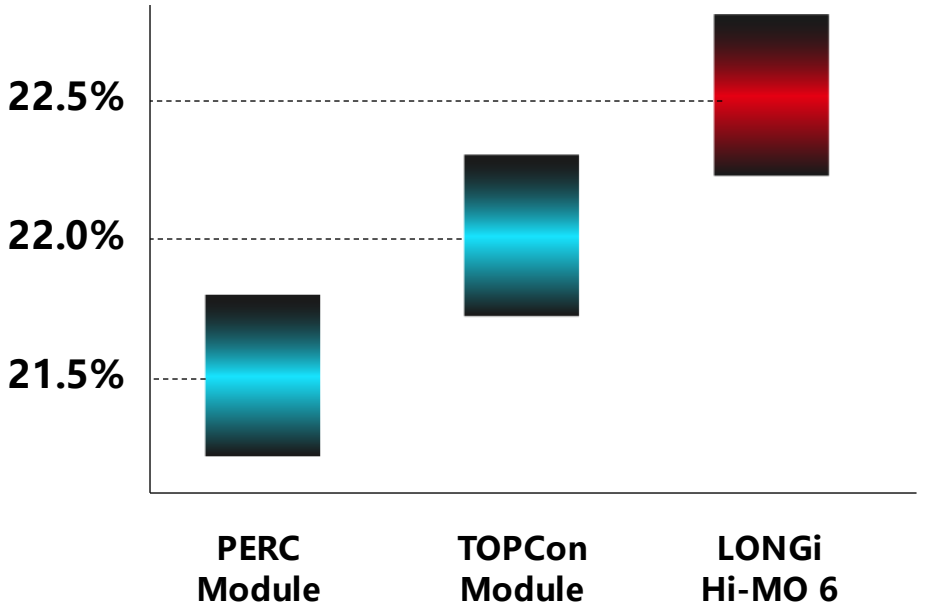
PRO Hydrogen passivation process repairs micro lattice defects and exceeds the efficiency limit

HPBC demonstrates significant efficiency improvement when compared to PERC and TOPCon technology

Cell Efficiency of HPBC in Mass Production

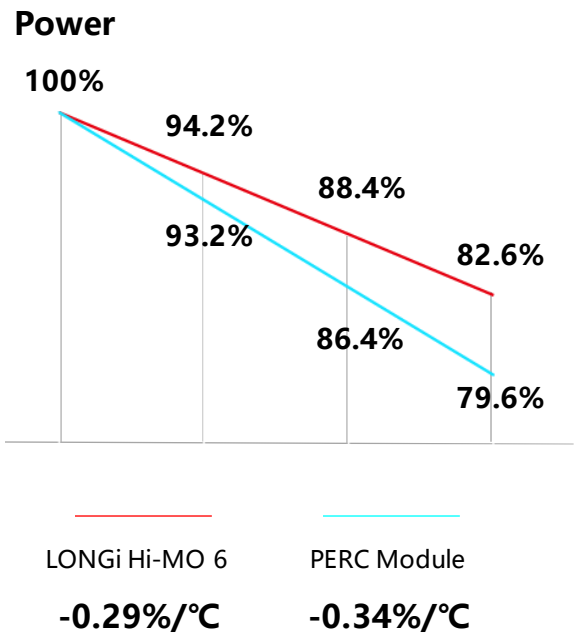


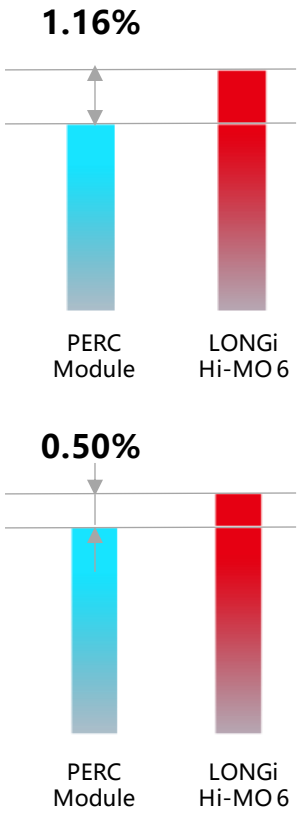
Module Efficiency



Better Performance from HPBC:

Power temperature coefficient as low as 0.29%/℃





Mankok, Thailand

Hot and sunny climate

Abundant light resources

Annual average temperature: 24℃~32℃

Project type: commercial building

Module version: 182-72c mono-facial

Plant area: 4650㎡

Installation dip angle: 3°

Stockholm, Sweden

Moderate climate

Lighting resources: General

Annual average temperature: 3℃~10℃

Project type: luxury villa

Module version: 182-54c mono-facial

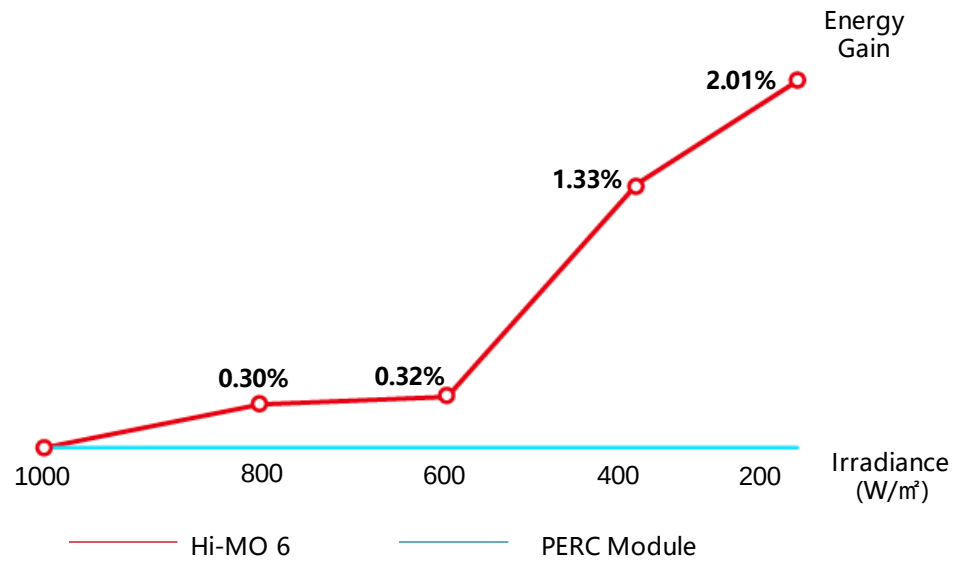
Plant area: 39㎡

Roof inclination: 30°

*Power generation data based on PVsyst simulation

Better Performance from HPBC:
Low irradiation performance

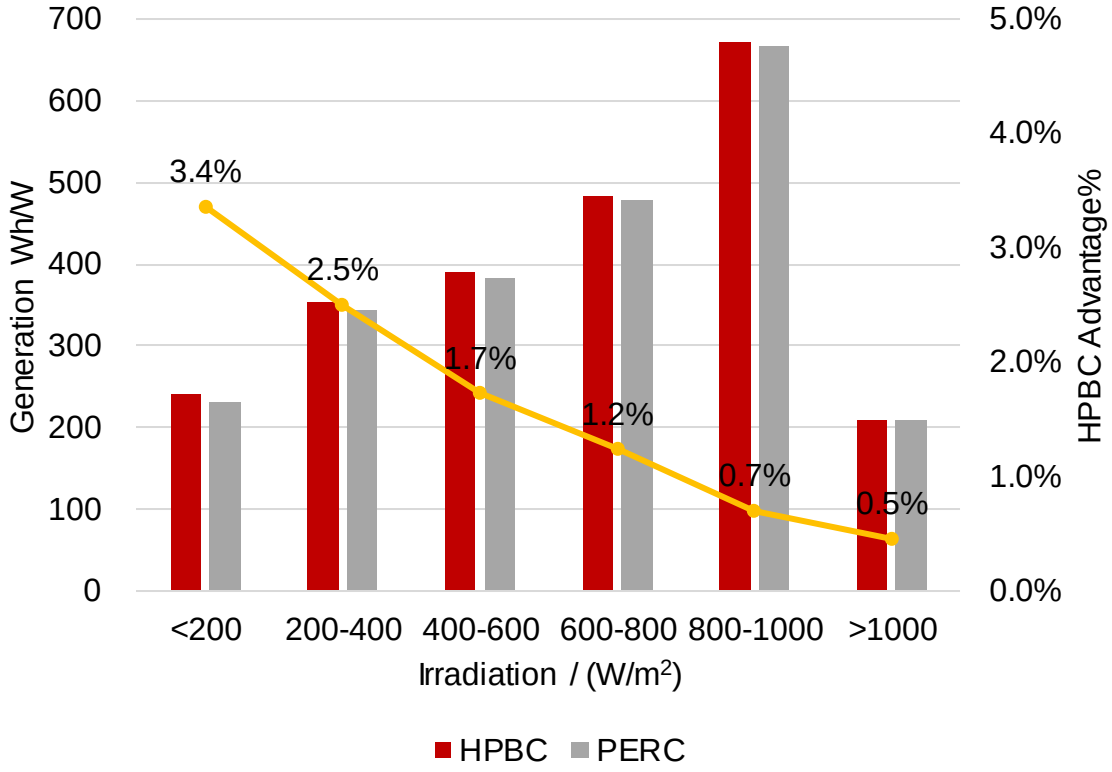
Better low irradiation performance



HPBC capabilities to produce energy under low irradiation are up to +2.01% better compared to standard product

*Gain=HPBC normalization PR/PERC normalization PR-1 *Data from TUV SUD

Field test comparison between HPBC and PERC

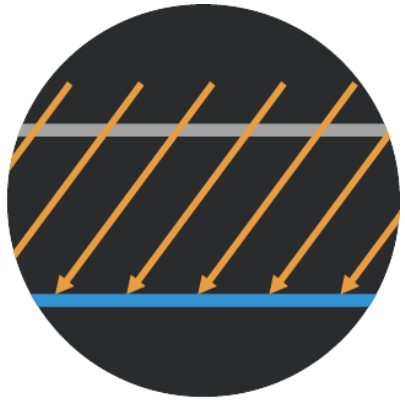


Better Performance from HPBC:
Enhanced oblique light absorption

LONGi Hi-MO 6

No ribbon shielding

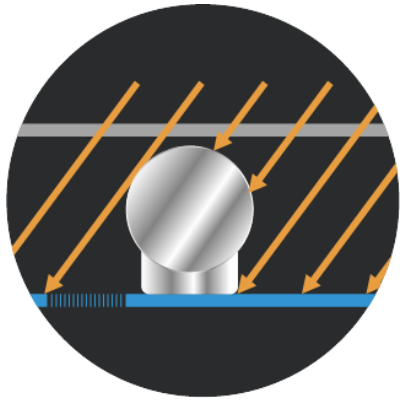
Maximizes light trapping

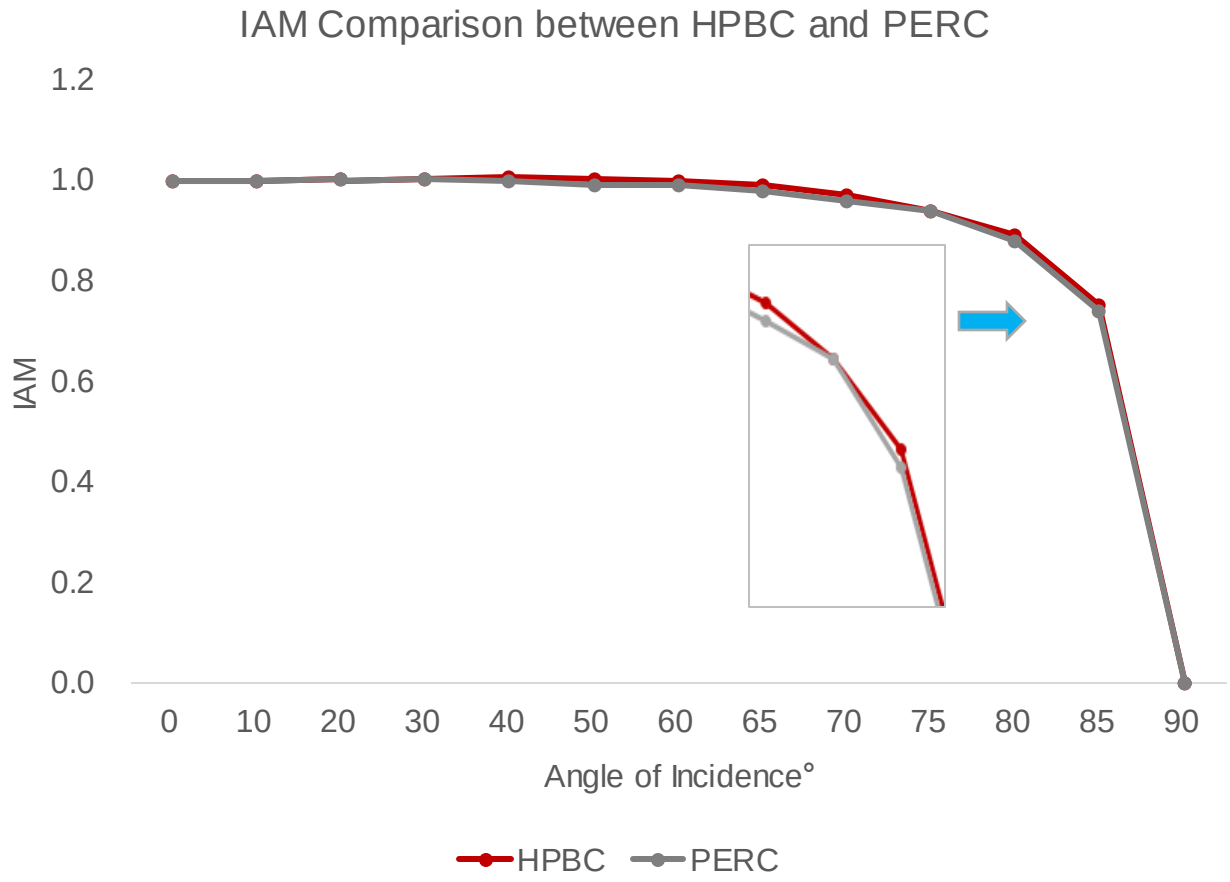


PERC Module

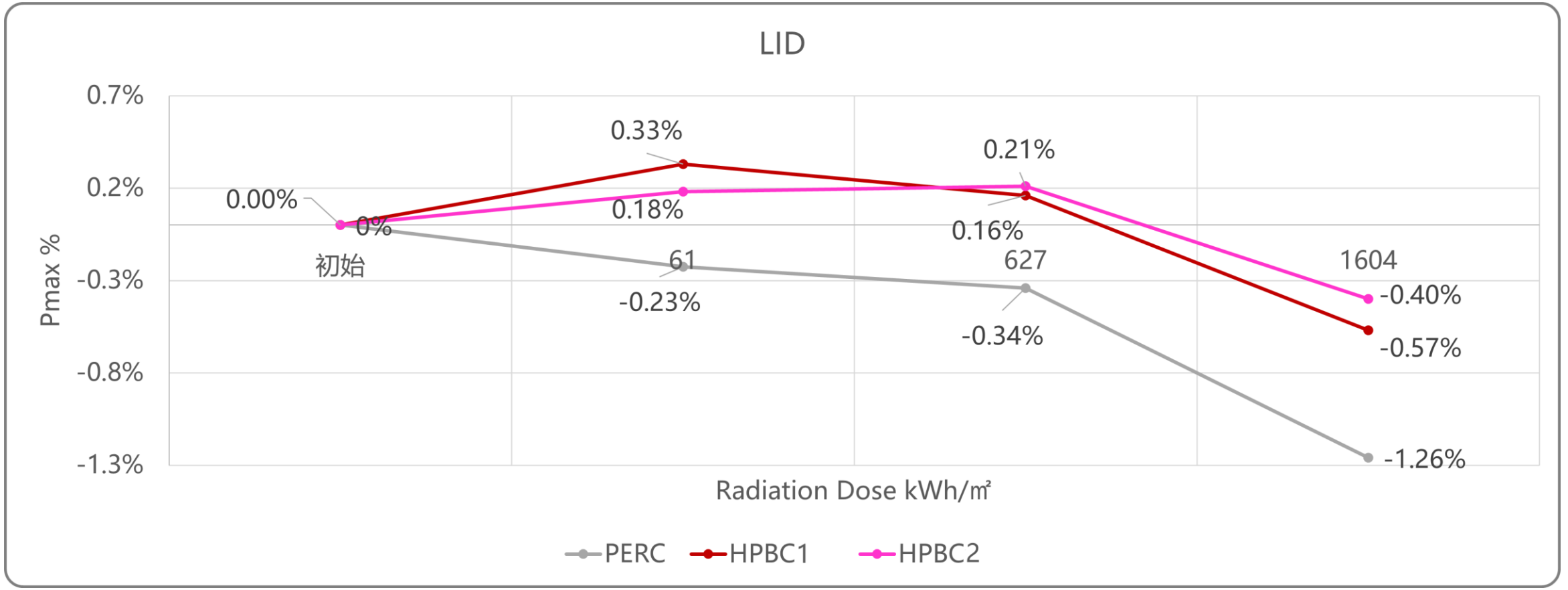
Cell shielded by ribbons

Creates inactive areas





Lower LID Degradation from HPBC



Test Site: Taizhou, 2021.01-2022.03

Lower degradation ensure stable power generation over 30 years

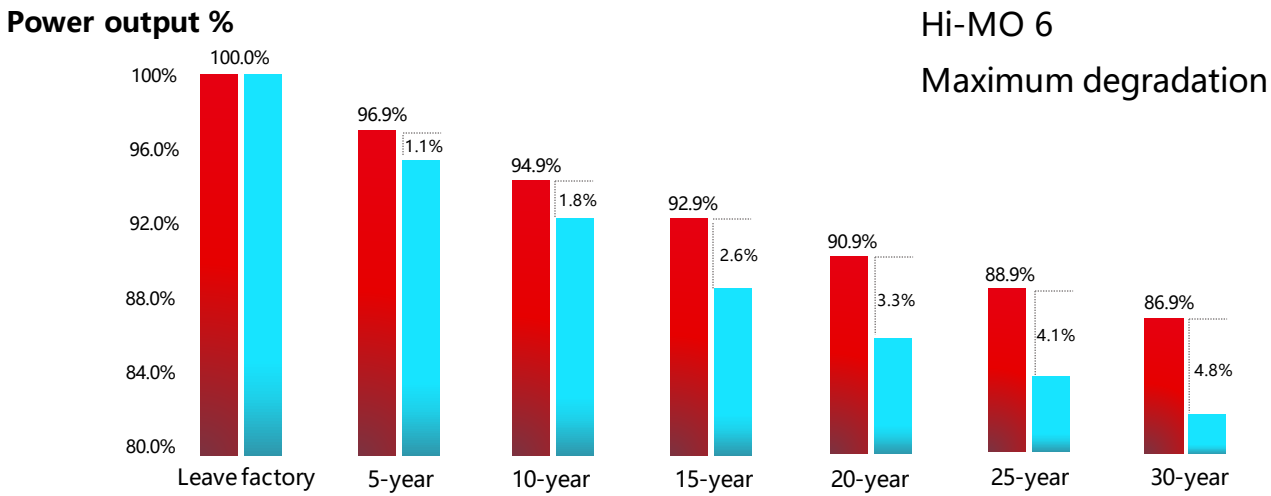
Degradation Warranty

Max. first year degradation **1.5%**

Max. annual degradation **0.4%**

LONGi Hi-MO 6

PERC Module



Protecting your investment by long warranties

Single glass module

25-years warranty

25th-year 88.9%

power output warranty

Dual glass module

30-years warranty

30th-year 86.9%

power output warranty

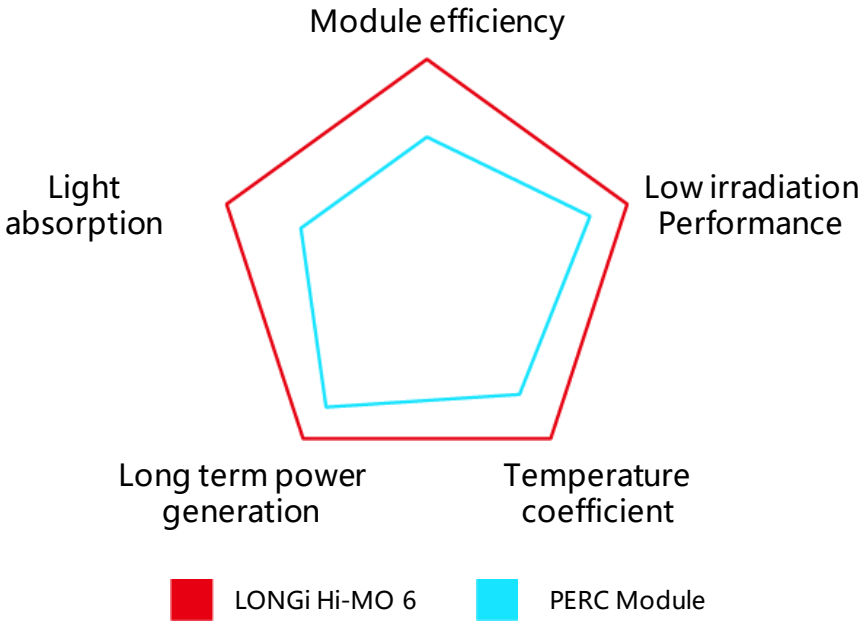
*Hi-MO 6 series have extended warranty service

Energy generation simulation of typical regions worldwide

10% higher on average than conventional PERC module

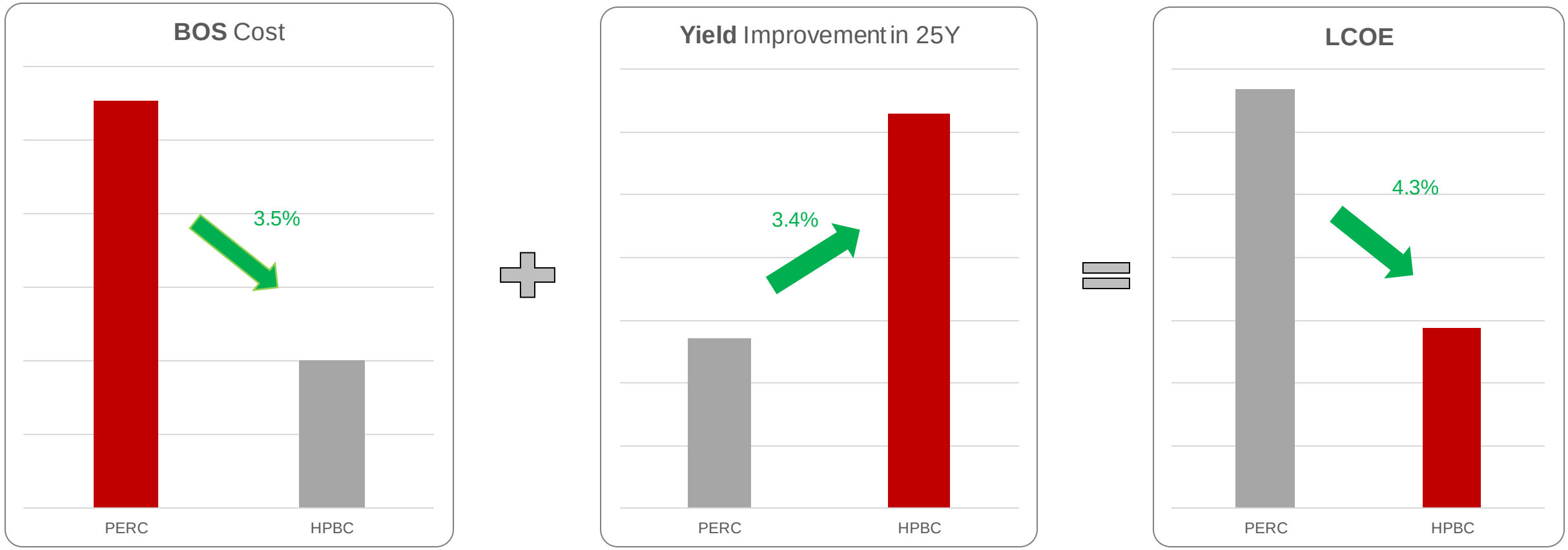
	Capacity Installed in the same area (kWp)	Annual Performance (kWh/kWp/Year)	1st year simulated energy generation (MWh/year)	Cumulative Degradation (25 years)	25th year simulated energy generation (MWh/25Y)
			MADRID, SPAIN		
PERC 550W	8,8	1651	14,5	9,41%	332,0
HiMO6 575W	9,2	1691	15,6	6,72%	364,5
Gain	+4,5%	+2,4%	**+7,1%**	2,7%	**+9,8%**
Tech Improvements	Efficiency	IAM + Low Irradiation + Temp Coef	**Extra Energy 1st year**	1st year deg + yearly degradation	**Extra Energy 25Y**

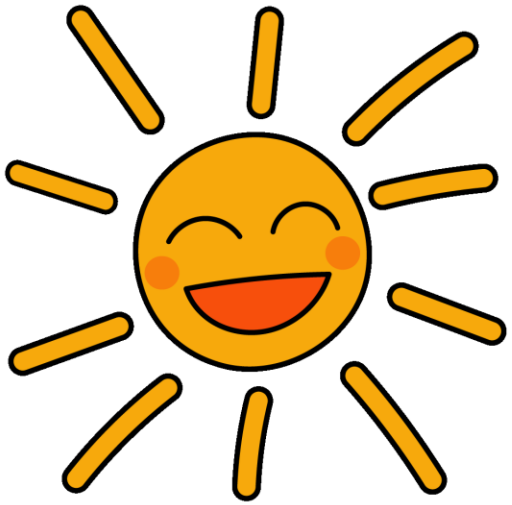
Comprehensive improvement of energy generation



*Power generation data based on PVsyst simulation

Customer value summarizations of HPBC





Bright Sunny Future!!

Dr. SHEN,PEIJUN

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Email: peijunshen@longi.com

Thank you!

- **https://en.longi-solar.com**
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